

AMENDMENTS TO THE CLAIMS

1. (previously presented): A recombinant expression system comprising a host cell comprising a nucleic acid encoding a phytase enzyme (i) having the amino acid sequence as set forth in SEQ ID NO:2, or (ii) having an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432, wherein the nucleic acid is operably linked to a transcription control sequence.
2. (previously presented): A vector comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1, (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2, or (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.
3. (previously presented): The expression system of claim 1 wherein the transcription control sequence comprises a constitutive promoter.
4. (previously presented): The expression system of claim 1 wherein the transcription control sequence comprises a tissue-specific promoter.
5. (previously presented): The expression system of claim 1 wherein said host cell is a prokaryotic cell.
6. (previously presented): The expression system of claim 1 wherein said host cell is a eukaryotic cell.
7. (previously presented): The expression system of claim 1 wherein said host cell is a plant cell.
8. (currently amended): The expression system of claim 1 or 16 wherein the nucleic acid further comprises a heterologous sequence encoding a signal peptide or a transit peptide.

9. (previously presented): The expression system of claim 8 wherein said signal peptide is a pathogenesis-related (PR) protein PR-S signal peptide from tobacco.

10. (previously presented): A prokaryotic cell comprising an exogenous nucleic acid encoding a phytase enzyme, wherein the nucleic acid is operably linked to a transcriptional control sequence and the phytase enzyme (i) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1, (ii) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) comprises an amino acid sequence as set forth in SEQ ID NO:2, or (iv) comprises an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

11. (previously presented): A eukaryotic cell comprising an exogenous nucleic acid encoding a phytase enzyme, wherein the nucleic acid is operably linked to a transcriptional control sequence and the phytase enzyme (i) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1, (ii) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) comprises an amino acid sequence as set forth in SEQ ID NO:2, or (iv) comprises an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

12. (previously presented): A cell comprising an exogenous nucleic acid encoding a phytase enzyme, wherein the nucleic acid is operably linked to a transcriptional control sequence and the phytase enzyme (i) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1, (ii) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) comprises an amino acid sequence as set forth in SEQ ID NO:2, or (iv) comprises an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

13. (currently amended): A method for making a phytase in a cell comprising:

(a) culturing the cell of claim 12 under conditions wherein the ~~exogenous nucleic acid encoding the phytase enzyme~~ is expressed.

14-15. (canceled)

16. (currently amended): An expression system for making a polypeptide having phytase activity, comprising a host cell and an exogenous nucleic acid, wherein the exogenous nucleic acid codes for the polypeptide having phytase activity and wherein the host cell is capable of expressing the ~~exogenous nucleic acid polypeptide, the exogenous nucleic acid encodes the polypeptide having phytase activity,~~ and the polypeptide having phytase activity (i) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1, (ii) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) comprises an amino acid sequence as set forth in SEQ ID NO:2, ~~[[øf]]~~ (iv) comprises an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432, or enzymatically active fragments of (i), (ii), (iii) or (iv).

17. (previously presented): The expression system of claim 16, wherein the exogenous nucleic acid is operably linked to a transcriptional control sequence.

18. (previously presented): The expression system of claim 7 wherein said plant cell is a higher plant cell.

19. (previously presented): The expression system of claim 8 wherein the signal peptide is a secretory signal peptide.

20. (previously presented): The expression system of claim 1 or claim 16, wherein the nucleic acid further comprises a promoter sequence, a secretory sequence, a stabilizing sequence, a targeting sequence or a termination sequence.

21. (previously presented): The expression system of claim 1 or claim 16, wherein the nucleic acid is contained in a vector.

22. (previously presented): The expression system of claim 21, wherein the vector comprises at least a portion of a nucleotide sequence taken from a cloning vector, an expression

vector, a bacterial vector, a plasmid, a viral particle, a phage, chromosomal DNA, nonchromosomal DNA, synthetic DNA, a vaccinia vector, an adenovirus vector, a fowl pox virus, a pseudorabies vector or a combination of nucleotide sequences thereof.

23. (previously presented): The vector of claim 2, wherein the vector comprises at least a portion of a nucleotide sequence taken from a cloning vector, an expression vector, a bacterial vector, a plasmid, a viral particle, a phage, chromosomal DNA, nonchromosomal DNA, synthetic DNA, a vaccinia vector, an adenovirus vector, a fowl pox virus, a pseudorabies vector or a combination of nucleotide sequences thereof.

24. (previously presented): The eukaryotic cell of claim 11, wherein the eukaryotic cell is a plant cell.

25. (previously presented): The eukaryotic cell of claim 24, wherein the plant cell is a higher plant cell.

26. (previously presented): The eukaryotic cell of claim 24, wherein the plant cell is a seed cell.

27. (previously presented): The eukaryotic cell of claim 24, wherein the plant cell is an edible flower cell, a cauliflower cell, an artichoke cell, a fruit cell, an apple cell, a banana cell, a berry cell, a currant cell, a cherry cell, a cucumber cell, a grape cell, a lemon cell, a melon cell, a nut cell, an orange cell, a peach cell, a pear cell, a plum cell, a strawberry cell, a tomato cell, a leaf cell, an alfalfa cell, a cabbage cell, an endive cell, a leek cell, a lettuce cell, a spinach cell, a tobacco cell, a root cell, an arrowroot cell, a beet cell, a carrot cell, a cassava cell, a turnip cell, a radish cell, a yam cell, a sweet potato cell, a bean cell, a pea cell, a soybean cell, a wheat cell, a barley cell, a corn cell, a rice cell, a rapeseed cell, a millet cell, a sunflower cell, an oat cell, a tuber cell, a kohlrabi cell or a potato cell.

28. (previously presented): The method of claim 13, further comprising converting the cell into a composition suitable for animal feed.

29. (previously presented): The method of claim 13, wherein the cell is a prokaryotic cell or a eukaryotic cell.

30. (previously presented): The method of claim 29, wherein the eukaryotic cell is a plant cell.

31. (previously presented): The method of claim 30, wherein the plant cell is a higher plant cell.

32. (previously presented): The method of claim 30, wherein the plant cell is a seed cell.

33. (previously presented): The method of claim 30 wherein the plant cell is an edible flower cell, a cauliflower cell, an artichoke cell, a fruit cell, an apple cell, a banana cell, a berry cell, a currant cell, a cherry cell, a cucumber cell, a grape cell, a lemon cell, a melon cell, a nut cell, an orange cell, a peach cell, a pear cell, a plum cell, a strawberry cell, a tomato cell, a leaf cell, an alfalfa cell, a cabbage cell, an endive cell, a leek cell, a lettuce cell, a spinach cell, a tobacco cell, a root cell, an arrowroot cell, a beet cell, a carrot cell, a cassava cell, a turnip cell, a radish cell, a yam cell, a sweet potato cell, a bean cell, a pea cell, a soybean cell, a wheat cell, a barley cell, a corn cell, a rice cell, a rapeseed cell, a millet cell, a sunflower cell, an oat cell, a tuber cell, a kohlrabi cell or a potato cell.

34. (canceled)

35. (previously presented): A vector comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ

ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

36. (previously presented): A cell comprising a vector comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

37. (previously presented): An expression system comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

38. (previously presented): A cloning vector comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or,

(v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

39. (previously presented): An expression vector comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

40. (previously presented): A bacterial vector comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

41. (previously presented): A plasmid comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth

in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

42. (previously presented): A viral particle comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

43. (previously presented): A phage comprising a nucleic acid (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

44. (canceled)

45. (previously presented): A recombinant expression system comprising a nucleic acid encoding a phytase enzyme (i) having the amino acid sequence as set forth in SEQ ID NO:2, or (ii) having an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

46. (currently amended): A method for making a phytase in a cell, wherein the phytase is encoded by an exogenous nucleic acid, comprising culturing the cell under conditions wherein an ~~exogenous nucleic acid encoding~~ the phytase is expressed,

wherein the exogenous nucleic acid (i) comprises a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprises a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (iv) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

47-80. (canceled)

81. (new): A method for making a phytase in a cell, wherein the phytase is encoded by an exogenous nucleic acid, comprising culturing the cell under conditions wherein the phytase is expressed,

wherein the exogenous nucleic acid (i) comprises a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprises a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprises a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

82. (new): An expression system for making a polypeptide having phytase activity, comprising a host cell and an exogenous nucleic acid, wherein the exogenous nucleic acid codes for the polypeptide having phytase activity and wherein the host cell is capable of expressing the polypeptide,

and the polypeptide having phytase activity (i) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1, (ii) is encoded by a nucleic acid comprising a sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) comprises an amino acid sequence as set forth in SEQ ID NO:2, (iv) comprises an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432, or (v) is encoded by a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432.

83. (new): A recombinant expression system comprising a host cell comprising

(1) a nucleic acid encoding a phytase comprising an amino acid sequence as set forth in (i) SEQ ID NO:2, or, (ii) SEQ ID NO:2 from amino acid residue 1 to 432, wherein the phytase sequence of (i) or (ii) has at least one conservative amino acid substitution from SEQ ID NO:2, and the conservative amino acid substitution comprises (a) a replacement, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile, (b) an interchange of the hydroxyl residues Ser and Thr, (c) an exchange of the acidic residues Asp and Glu, (d) a substitution between the amide residues Asn and Gln, (e) an exchange of the basic residues Lys and Arg, (f) a replacement among the aromatic residues Phe, Tyr, or (g) any combination of a, b, c, d, e or f; or

(2) a nucleic acid comprising a sequence that is the complete complement of (1);

wherein the nucleic acid is operably linked to a transcriptional control sequence, and the amino acid sequence of the phytase has at least or about 95% sequence identity to SEQ ID NO:2.

84. (new): A recombinant expression system comprising a host cell comprising

(1) a nucleic acid encoding an enzymatically active fragment of a phytase, wherein the phytase comprises an amino acid sequence as set forth in (i) SEQ ID NO:2 or (ii) residues 1 to 432 of SEQ ID NO:2, wherein the phytase sequence of (i) or (ii) has at least one conservative amino acid substitution from SEQ ID NO:2, wherein the conservative amino acid substitution comprises (a) a replacement, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile, (b) an interchange of the hydroxyl residues Ser and Thr, (c) an exchange of the acidic residues Asp and Glu, (d) a substitution between the amide residues Asn and Gln, (e) an exchange of the basic residues Lys and Arg, (f) a replacement among the aromatic residues Phe, Tyr, or (g) any combination of a, b, c, d, e or f, or

(2) a nucleic acid comprising a sequence that is the complete complement of (1); wherein the nucleic acid is operably linked to a transcriptional control sequence, and the amino acid sequence of the phytase has at least or about 95% sequence identity to SEQ ID NO:2.

85. (new): A vector comprising

(1) a nucleic acid encoding a phytase comprising an amino acid sequence as set forth in (i) SEQ ID NO:2, or, (ii) SEQ ID NO:2 from amino acid residue 1 to 432, wherein the phytase sequence of (i) or (ii) has at least one conservative amino acid substitution from SEQ ID NO:2, and the conservative amino acid substitution comprises (a) a replacement, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile, (b) an interchange of the hydroxyl residues Ser and Thr, (c) an exchange of the acidic residues Asp and Glu, (d) a substitution between the amide residues Asn and Gln, (e) an exchange of the basic residues Lys and Arg, (f) a replacement among the aromatic residues Phe, Tyr, or (g) any combination of a, b, c, d, e or f; or

(2) a nucleic acid comprising a sequence that is the complete complement of (1); wherein the nucleic acid is operably linked to a transcriptional control sequence, and the amino acid sequence of the phytase has at least or about 95% sequence identity to SEQ ID NO:2.

86. (new) A vector comprising a host cell comprising

(1) a nucleic acid encoding an enzymatically active fragment of a phytase, wherein the phytase comprises an amino acid sequence as set forth in (i) SEQ ID NO:2 or (ii) residues 1 to 432 of SEQ ID NO:2, wherein the phytase sequence of (i) or (ii) has at least one conservative amino acid substitution from SEQ ID NO:2, wherein the conservative amino acid substitution comprises (a) a replacement, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile, (b) an interchange of the hydroxyl residues Ser and Thr, (c) an exchange of the acidic residues Asp and Glu, (d) a substitution between the amide residues Asn and Gln, (e) an exchange of the basic residues Lys and Arg, (f) a replacement among the aromatic residues Phe, Tyr, or (g) any combination of a, b, c, d, e or f, or

(2) a nucleic acid comprising a sequence that is the complete complement of (1);

wherein the nucleic acid is operably linked to a transcriptional control sequence, and the amino acid sequence of the phytase has at least or about 95% sequence identity to SEQ ID NO:2.

87. (new) A cell comprising

(1) an exogenous nucleic acid encoding a phytase comprising an amino acid sequence as set forth in (i) SEQ ID NO:2, or, (ii) SEQ ID NO:2 from amino acid residue 1 to 432, wherein the phytase sequence of (i) or (ii) has at least one conservative amino acid substitution from SEQ ID NO:2, and the conservative amino acid substitution comprises (a) a replacement, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile, (b) an interchange of the hydroxyl residues Ser and Thr, (c) an exchange of the acidic residues Asp and Glu, (d) a substitution between the amide residues Asn and Gln, (e) an exchange of the basic residues Lys and Arg, (f) a replacement among the aromatic residues Phe, Tyr, or (g) any combination of a, b, c, d, e or f; or

(2) a nucleic acid comprising a sequence that is the complete complement of (1);

wherein the nucleic acid is operably linked to a transcriptional control sequence, and the amino acid sequence of the phytase has at least or about 95% sequence identity to SEQ ID NO:2.

88. (new) A cell comprising

(1) an exogenous nucleic acid encoding an enzymatically active fragment of a phytase, wherein the phytase comprises an amino acid sequence as set forth in (i) SEQ ID NO:2 or (ii) residues 1 to 432 of SEQ ID NO:2, wherein the phytase sequence of (i) or (ii) has at least one conservative amino acid substitution from SEQ ID NO:2, wherein the conservative amino acid substitution comprises (a) a replacement, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile, (b) an interchange of the hydroxyl residues Ser and Thr, (c) an exchange of the acidic residues Asp and Glu, (d) a substitution between the amide residues Asn and Gln, (e) an exchange of the basic residues Lys and Arg, (f) a replacement among the aromatic residues Phe, Tyr, or (g) any combination of a, b, c, d, e or f; or

(2) a nucleic acid comprising a sequence that is the complete complement of (1); wherein the nucleic acid is operably linked to a transcriptional control sequence, and the amino acid sequence of the phytase has at least or about 95% sequence identity to SEQ ID NO:2.

89. (new) A method for glycosylating a polypeptide comprising:

a) providing a nucleic acid comprising a sequence encoding a polypeptide having phytase activity to a cell, wherein the sequence (i) comprises a nucleotide sequence as set forth in SEQ ID NO:1; (ii) comprises a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296, (iii) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; (iv) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or, (v) comprises a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; and

b) expressing the polypeptide in the cell wherein the cell is capable of glycosylating the polypeptide.

90. (new) The method of claim 89, wherein the cell is a yeast cell.

91. (new) The glycosylated polypeptide obtained by the method of claim 89 or 90.
92. (new) An expression system comprising a nucleic acid
- (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1;
 - (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296;
 - (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2;
 - (iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;
 - (v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;
 - (vi) comprising a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;
 - (vii) encodes a polypeptide comprising an amino acid sequence as set forth in (iii) or (iv) but lacking a leader sequence;
 - (viii) comprising a nucleotide sequence as set forth in (i),(ii), (v) or (vi) and a heterologous nucleotide sequence imparting a desired characteristic; or
 - (ix) encodes a polypeptide comprising an amino acid sequence as set forth in (iii), (iv) or (vii) and a heterologous nucleotide sequence imparting a desired characteristic.

93. (new) A nucleic acid
- (i) comprising a nucleotide sequence as set forth in SEQ ID NO:1;
 - (ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296;
 - (iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2;

(iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(vi) comprising a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;

(vii) encodes a polypeptide comprising an amino acid sequence as set forth in (iii) or (iv) but lacking a leader sequence;

(viii) comprising a nucleotide sequence as set forth in (i),(ii), (v), or (vi) and a heterologous nucleotide sequence imparting a desired characteristic; or

(ix) encodes a polypeptide comprising an amino acid sequence as set forth in (iii), (iv), or (vii) and a heterologous nucleotide sequence imparting a desired characteristic.

94. (new) A method for glycosylating a polypeptide comprising:

a) providing a nucleic acid comprising a sequence encoding a polypeptide having phytase activity to a cell, wherein the sequence

(i) comprises a nucleotide sequence as set forth in SEQ ID NO:1;

(ii) comprises a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296,

(iii) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2;

(iv) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; or,

(v) comprises a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an

amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432; (vi) a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;

(vi) comprises a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;

(vii) comprises an amino acid sequence as set forth in (iii) or (iv) but lacking a leader sequence;

(viii) comprises a nucleotide sequence as set forth in (i),(ii), (v), or (vi) and a heterologous nucleotide sequence imparting a desired characteristic; or

(ix) comprises an amino acid sequence as set forth in (iii), (iv), or (vii) and a heterologous nucleotide sequence imparting a desired characteristic; and

b) expressing the polypeptide in the cell wherein the cell is capable of glycosylating the polypeptide.

95. (new) The method of claim 89, wherein the cell is a yeast cell.

96. (new) The glycosylated polypeptide obtained by the method of claim 89 or 90.

97. (new) A cell

(i) comprising a nucleotide sequence as set forth in SEQ ID NO:1;

(ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296;

(iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2;

(iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(vi) comprising a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;

(vii) encodes a polypeptide comprising an amino acid sequence as set forth in (iii) or (iv) but lacking a leader sequence;

(viii) comprising a nucleotide sequence as set forth in (i),(ii), (v), or (vi) and a heterologous nucleotide sequence imparting a desired characteristic; or

(ix) encodes a polypeptide comprising an amino acid sequence as set forth in (iii), (iv), or (vii) and a heterologous nucleotide sequence imparting a desired characteristic.

98. (new) A vector

(i) comprising a nucleotide sequence as set forth in SEQ ID NO:1;

(ii) comprising a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296;

(iii) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2;

(iv) encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(v) comprising a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(vi) comprising a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;

(vii) encodes a polypeptide comprising an amino acid sequence as set forth in (iii) or (iv) but lacking a leader sequence;

(viii) comprising a nucleotide sequence as set forth in (i),(ii), (v), or (vi) and a heterologous nucleotide sequence imparting a desired characteristic; or

(ix) encodes a polypeptide comprising an amino acid sequence as set forth in (iii), (iv), or (vii) and a heterologous nucleotide sequence imparting a desired characteristic.

99. (new) A method of making a phytase in a cell, wherein the phytase is encoded by an exogenous nucleic acid, comprising culturing the cell under conditions wherein the phytase is expressed,

wherein the exogenous nucleic acid

(i) comprises a nucleotide sequence as set forth in SEQ ID NO:1;

(ii) comprises a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residue 1 to 1296;

(iii) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2;

(iv) encodes a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(v) comprises a sequence that is the complete complement of (a) a nucleotide sequence as set forth in SEQ ID NO:1; (b) a nucleotide sequence as set forth in SEQ ID NO:1 from nucleotide residues 1 to 1296; (c) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2; or (d) the nucleic acid encoding a polypeptide comprising an amino acid sequence as set forth in SEQ ID NO:2 from amino acid residue 1 to 432;

(vi) comprises a nucleotide sequence as set forth in (i),(ii), or (v) but lacking a leader sequence;

(vii) encodes a polypeptide comprising an amino acid sequence as set forth in (iii) or (iv) but lacking a leader sequence;

(viii) comprises a nucleotide sequence as set forth in (i),(ii), (v), or (vi) and a heterologous nucleotide sequence imparting a desired characteristic; or

(ix) encodes a polypeptide comprising an amino acid sequence as set forth in (iii), (iv), or (vii) and a heterologous nucleotide sequence imparting a desired characteristic.